EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	154	CMP and fluorescent and (interconnect or interconnection or damascence)	US-PGPUB; USPAT	OR	ON	2006/09/06 10:26
L2	137	1 and @ad<"20041004"	US-PGPUB; USPAT	OR	ON	2006/09/06 11:26
L3	12434	(EuTTA or (chelates with (La or Sm or Eu or Gd, or Lu or Yb or Tb or Dy or Tm)) or diketone)and @ad<"20041004"	US-PGPUB; USPAT	OR	ON	2006/09/06 10:49
L4	10009	3 and (CMP or polish or polishing or remove or removing or removed)	US-PGPUB; USPAT	OR	ON	2006/09/06 10:50
L5	2155	3 and (CMP or polish or polishing pr polished)	US-PGPUB; USPAT	OR	ON	2006/09/06 10:40
L6	564	5 and fluorescent	US-PGPUB; USPAT	OR	ON	2006/09/06 10:45
L7	9936	3 and (remove or removing or removed)	US-PGPUB; USPAT	OR	ON	2006/09/06 10:45
L8	2318	7 and fluorescent	US-PGPUB; USPAT	OR	ON	2006/09/06 10:50
L9	1807	8 not 6	US-PGPUB; USPAT	OR	ON	2006/09/06 10:45
L10	6871	(EuTTA or (chelates with (La or Sm or Eu or Gd, or Lu or Yb or Tb or Dy or Tm)) or diketone)	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2006/09/06 10:49
L11	1837	10 and (CMP or polish or polishing or remove or removing or removed)	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2006/09/06 10:50
L12	81	11 and fluorescent	USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2006/09/06 10:50
L14	4	(("20030084918") or ("20030121529") or ("20030197859") or ("20030139048")).PN.	US-PGPUB; USPAT	OR	OFF	2006/09/06 11:27

DOCUMENT-IDENTIFIER: US 20040005769 A1

TITLE: Method and apparatus for endpoint detection

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Brief Description of Drawings Paragraph - DRTX (6):

[0018] FIGS. 5 is a cross sectional view of a segment of a substrate of this invention containing a **fluorescent** layer and the various steps of a CMP process.

Detail Description Paragraph - DETX (6):

[0029] As used in this specification, the term "a target" refers to one or more structures that can be detected by a detection system. In one embodiment, the target is one or more line-space patterns, such as a periodic grating, that diffract light in a predictable manner. In another embodiment, the target is a compound or compounds that undergo a detectable change in response to light, such as **fluorescent,** phosphorescent, and/or other energy absorbing compounds. These compounds are herein referred to as spectrally active materials. Preferably, the target is one or more periodic gratings, or **fluorescent** or absorbing compounds, or a combination thereof.

Detail Description Paragraph - DETX (55):

[0076] In another embodiment, the target used in the various aspects of this invention is a spectrally active material. Spectral activity includes, but is not limited to, fluorescence, phosphorescence, and energy absorption and transient bleaching of the light-absorbing species which can then be measured by pulse-probe techniques. Classes of spectrally active materials that can be used in this embodiment of the invention include inorganic atomic species such as lanthanides, and organic dyes and chromophors. The preferred spectral activity is fluorescence. The preferred class of spectrally active **fluorescent** compounds are the atomic lanthanides. Examples of preferred lanthanides are Eu.sup.3+ and Er.sup.3+ producing light around 650 nm and 1.5 microns, respectively. The light used to induce fluorescence of these species can be pulsed or modulated at high frequency. Trivalent lanthanides typically have a decay half-life of a microsecond to ten milliseconds which would be of a shorter wavelength (higher energy) than the fluorescence wavelength, and could be introduced into the optical field of view by application of a dichroic mirror.

Detail Description Paragraph - DETX (56):

[0077] The **fluorescent** material used in this embodiment of the invention is of the correct valence state to fluoresce while in the wafer and is protected in the oxide matrix from collisions so that it can hold excitation long enough to de-excite radiatively while on the wafer. However, once the **fluorescent** material enters the slurry, its chemical form and/or its valence state changes and it ceases to fluoresce. Alternatively, the simple washing away and dilution of the **fluorescent** material may stop or reduce its **fluorescent** signal.

Detail Description Paragraph - DETX (57):

[0078] FIGS. 5A-5D represent an example of the embodiment of the invention where the target is a spectrally active material. Referring now to the FIGS. 5A-5D, there is shown a cross-sectional view of a segment of a substrate (50), including a **fluorescent** material layer, after various steps of a fabrication process according to the present invention. FIG. 5A depicts a substrate having a lower layer (54), a first layer of material (53), an endpoint layer comprising a **fluorescent** material (52), a second layer of material (51), and a top surface (55). Lower layer (54) maybe a deposited layer or it maybe the base substrate of the wafer, such as silicon in an integrated circuit. Chemical mechanical planarization of top surface (55) is conducted while the level of fluorescence from the wafer is measured. Continued planarization of top surface (55) removes material from second layer (51), as shown in FIG. 5B, until the endpoint layer is reached, at which point the removal of the **fluorescent** material from the wafer into the slurry begins. As this occurs, the level of fluorescence from the wafer is reduced, indicating that the endpoint is close or has been reached. A partially removed endpoint layer is depicted in FIG. 5C. Continued planarization results in complete removal of the target layer, as shown in FIG. 5D, and the cessation of fluorescence from the wafer. A fluorescence detector continuously or intermittently detects the reduction or cessation of fluorescence from the wafer as the **fluorescent** material is removed from the wafer into the slurry solution.

Detail Description Paragraph - DETX (63):

[0084] Detection systems and associated optical systems for detecting the various targets of the invention are well known in the art. For example, detection systems for detecting **fluorescent** compounds are described in U.S. Pat. Nos. 6,317,206, 6,310,352, 6,303,929, 6,297,509, 4,202,491, each of which is herein incorporated by reference in its entirety.

Claims Text - CLTX (9):

8. The method of claim 1 wherein the target is a **fluorescent** compound.

Claims Text - CLTX (10):
9. The method of claim 8 wherein said **fluorescent** compound contains a trivalent lanthanide.

Claims Text - CLTX (23):
22. The method of claim 13 wherein the target is a **fluorescent** compound.

Claims Text - CLTX (24):
23. The method of claim 22 wherein the **fluorescent** compound is a trivalent lanthanide.

Claims Text - CLTX (25):
24. The method of claim 22 wherein the **fluorescent** compound is detected in step (f) by detecting the absence of fluorescence from the substrate.

Claims Text - CLTX (33):
32. The substrate of claim 26 wherein the target is a **fluorescent** compound.

Claims Text - CLTX (34):
33. The substrate of claim 26 wherein the **fluorescent** compound contains a trivalent lanthanide.